

1 1. A MIMO-based multiuser OFDM multiband of UWB base
2 station communication transmitter comprising:
3 a multiuser encoding and spreading unit;
4 a polyphase-based multiband;
5 an IFFT unit;
6 a filtering and spreading unit;
7 a MIMO-based multiband modulation and
8 multicarrier RF unit; and
9 a multiple antenna unit.

10 2. The MIMO-based multiuser OFDM multiband of UWB
11 base station communication transmitter of claim 1 wherein
12 said polyphase-based multiband includes a RAM memory bank
13 with a length size of N for storing serial input data and P
14 RAM memory banks with a length size of N/P for storing
15 parallel output data.

16 3. The MIMO-based multiuser OFDM multiband of UWB
17 base station communication transmitter of claim 2 wherein
18 polyphase-based multiband may produce P parallel data
19 sequences with a data rate of N/P from a serial data
20 sequence with a data rate of N .

21 4. The MIMO-based multiuser OFDM multiband of UWB
22 base station communication transmitter of claim 1 wherein
23 said filtering and spreading unit comprises a dual-switch,

24 a multiband spreading, two XOR, two transmitter shaped
25 filters, two D/A converters, and two analog reconstruction
26 filters.

27 5. The MIMO-based multiuser OFDM multiband of UWB
28 base station communication transmitter of claim 4 wherein
29 said multiband spreading produces an orthogonal sequence
30 for each of multi-frequency bands.

31 6. The MIMO-based multiuser OFDM multiband of UWB
32 base station communication transmitter of claim 5 wherein
33 signals of multi-frequency bands are orthogonal each other.

34 7. The MIMO-based multiuser OFDM multiband of UWB
35 base station communication transmitter of claim 1 wherein
36 said MIMO-based multiband modulation and multicarrier RF
37 unit includes eleven multiband modulations, eleven
38 additions, and eleven analog bandpass filters.

39 8. The MIMO-based multiuser OFDM multiband of UWB
40 base station communication transmitter of claim 7 wherein
41 the eleven multiband modulations equivalently contain one
42 of the modulations including BPSK, QPSK or 16-QAM.

43 9. The MIMO-based multiuser OFDM multiband of UWB
44 base station communication transmitter of claim 1 wherein

45 said multiple antenna unit may either enhance UWB signals
46 quality or increase UWB transmitting distance.

47 10. The MIMO-based multiuser OFDM multiband of UWB
48 base station communication transmitter of claim 1 wherein
49 said multiple antenna unit includes eleven independent
50 antennas.

51 11. A MIMO-based multiuser OFDM multiband of UWB
52 mobile communication receiver comprising:
53 an antenna unit;
54 a two-antenna based multiband RF receiver unit;
55 a combination section of an A/D unit, and a
56 digital receiver filter unit, and multiband-despreading
57 unit;
58 a TEQ, FFT and FEQ section;
59 a polyphase-based demultiband; and
60 a despreading, deinterleaver and decoding
61 section.

62 12. The MIMO-based multiuser OFDM multiband of UWB
63 mobile communication receiver of claim 11 wherein said
64 antenna unit contains two independent and identical
65 antennas.

66 13. The MIMO-based multiuser OFDM multiband of UWB
67 mobile communication receiver of claim 11 wherein said two-
68 antenna based multiband RF receiver unit includes two LNA,
69 two AGC, two analog bandpass filters, an addition, eleven
70 multiband down converters and demodulations.

71 14. The MIMO-based multiuser OFDM multiband of UWB
72 mobile communication receiver of claim 11 wherein said the
73 multiband despreading produces a unique and orthogonal
74 despreading sequence for each of the multi-frequency bands.

75 15. The MIMO-based multiuser OFDM multiband of UWB
76 mobile communication receiver of claim 11 wherein said
77 polyphase-based demultiband includes a RAM memory bank with
78 a length size of N , and P parallel RAM memory banks with a
79 length size of N/P .

80 16. The MIMO-based multiuser OFDM multiband of UWB
81 mobile communication receiver of claim 15 wherein said
82 polyphase-based demultiband produces a serial output
83 sequence with a data rate of N from P parallel input
84 sequences with a data rate of N/P .

85 17. A MIMO-based multiuser OFDM multiband of UWB
86 communication system comprises a MIMO-based multiuser OFDM
87 multiband of UWB base station communication transmitter and

88 receiver, and N users of the MIMO-based OFDM multiband of
89 UWB mobile communication transmitters and receivers;

90 18. The MIMO-based multiuser OFDM multiband of UWB
91 communication system of claim 17 wherein said the MIMO-
92 based multiuser OFDM multiband of UWB base station
93 communication transmitter and receiver has eleven
94 independent and identical antennas for eleven multi-
95 frequency bands with a programmable use.

96 19. The MIMO-based multiuser OFDM multiband of UWB
97 communication system of claim 18 wherein the fourth and/or
98 fifth antenna may be turned off avoiding a interference
99 with WLAN 802.11a devices.

100 20. The MIMO-based multiuser OFDM multiband of UWB
101 communication system of claim 17 wherein said each of the
102 MIMO-based OFDM multiband of UWB mobile communication
103 transmitters and receivers employs two independent and
104 identical antennas.